

2 in response to receiving a second request to perform second work from the first
3 process, determining based upon the second work and the mapping data,
4 that the second work is to be performed on a third node from the plurality
5 of nodes, and
6 providing the second request to a third process on the third node, wherein the
7 second request specifies that the first process is to receive results of the
8 second work directly from the third process.

1 3. The method as recited in Claim 1, further including the steps of
2 in response to receiving a second request to perform second work from a third
3 process on a third node from the plurality of nodes, determining based
4 upon the second work and the mapping data, that the second work is to be
5 performed on the second node, and
6 providing the second request to the second process, wherein the second request
7 specifies that the third process is to receive results of the second work
8 directly from the second process.

1 4. The method as recited in Claim 1, further including the steps of
2 in response to receiving a second request to perform second work from a third
3 process on a third node from the plurality of nodes, determining based
4 upon the second work and the mapping data, a fourth node from the
5 plurality of nodes on which the second work is to be performed, and
6 providing the second request to a fourth process on the fourth node, wherein the
7 second request specifies that the third process is to receive results of the
8 second work directly from the fourth process.

1 5. The method as recited in Claim 1, further including the steps of

2 determining based upon the first work and the mapping data, that the first work is
3 also to be performed on a third node from the plurality of nodes, and
4 providing a second request to a third process on the third node, wherein the
5 second request specifies that results of the first work performed on the
6 third node are to be provided from the third node directly to the first
7 process.

1 6. The method as recited in Claim 1, wherein the step of determining that the first
2 work is to be performed on a second node includes the step of
3 determining one or more resources required to perform the first work, and
4 determining which of the plurality of nodes is allowed to perform the first work
5 on the one or more resources.

1 7. The method as recited in Claim 1, wherein:
2 the step of determining that the first work is to be performed on a second node
3 from the plurality of nodes includes the step of a director determining that
4 the first work is to be performed on a second node from the plurality of
5 nodes, and
6 the step of providing the first work request to a second process on the second
7 node includes the step of the director providing the first work request to a
8 second process on the second node.

1 8. The method as recited in Claim 1, further comprising the step of upon completion
2 of the first work, the second process providing the results of the first work directly
3 to the first process.

1 9. The method as recited in Claim 1, wherein the first work request is a remote
2 procedure call.

1 10. The method as recited in Claim 1, further including the step of generating an
2 updated first work request that specifies that the first process is to receive the first
3 results of performing the first work and wherein the step of providing the first
4 work request to a second process includes the step of providing the updated first
5 work request to the second process.

1 11. A method for processing data on a distributed computing system that includes a
2 plurality of nodes, the method comprising the steps of:
3 a director maintaining mapping data that specifies work that can be performed by
4 each of the plurality of nodes;
5 [a] the director receiving a first remote procedure call from a first client process on
6 a first client node from the plurality of nodes, wherein the first remote
7 procedure call requests that first work be performed and that results of the
8 first work be provided directly to the first client process;
9 the director examining the first remote procedure call and determining based upon
10 the first work and the mapping data, that a first server process on a first
11 server node from the plurality of nodes is to perform the first work; and
12 the director providing the first remote procedure call to the first server process.

1 12. The method as recited in Claim 11, further including the steps of
2 the director determining one or more resources required to perform the first work,
3 and
4 the director determining which of the plurality of nodes have permission to
5 perform a requested operation on the one or more resources required to
6 perform the first work.

1 13. The method as recited in Claim 12, wherein the step of the director determining
2 the resources available on the plurality of nodes includes the director examining
3 resource data associated with the plurality of nodes.

1 14. The method as recited in Claim 11, further including the steps of
2 the director receiving a second remote procedure call from the first client process,
3 wherein the second remote procedure call requests that second work be
4 performed and that results of the second work be provided directly to the
5 first client process,
6 the director examining the second remote procedure call and determining based
7 upon the second work and the mapping data, that a second server process
8 on a second server node from the plurality of nodes is to perform the
9 second work, and
10 the director providing the second remote procedure call to the second server
11 process.

1 15. The method as recited in Claim 11, further including the steps of
2 the director receiving a second remote procedure call from a second client process
3 on a second client node in the plurality of nodes, wherein the second
4 remote procedure call requests that second work be performed and that
5 results of the second work be provided directly to the second client
6 process,
7 the director examining the second remote procedure call and determining based
8 upon the second work and the mapping data, that a second server process
9 on a second server node from the plurality of nodes is to perform the
10 second work, and
11 the director providing the second remote procedure call to the second server
12 process.

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16. A distributed computing system for performing work, the distributed computing system comprising:
a plurality of nodes; and
a director communicatively coupled to the plurality of nodes, the director being configured to
maintain mapping data that specifies work that can be performed by each of the plurality of nodes,
in response to a first work request to perform first work from a first process on a first node from the plurality of nodes, determine based upon the first work and the mapping data, that the first work is to be performed on a second node from the plurality of nodes, and request that the first work be performed by a second process on the second node, wherein the request specifies that first results of the first work be provided from the second process directly to the first process.

17. The distributed computing system as recited in Claim 16, wherein the director is further configured to provide the first work request to the second process.

18. The distributed computing system as recited in Claim 16, wherein the director is further configured to
generate a second work request to [requests]request that the second process perform the first work and provide the first results directly to the first process, and
provide the second work request to the second process.

1 19. The distributed computing system as recited in Claim 16, further comprising
2 resource data that specifies the access rights of the plurality of nodes relative to
3 resources.

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sub-b3 20. A computer-readable medium carrying one or more sequences of one or more
2 instructions for processing data on a distributed computing system that includes a
3 plurality of nodes, the one or more sequences of one or more instructions include
4 instructions which, when executed by one or more processors, cause the one or
5 more processors to perform the steps of:
6 maintaining mapping data that specifies work that can be performed by each of
7 the plurality of nodes,
8 in response to receiving a first work request to perform first work from a first
9 process on a first node from the plurality of nodes, determining based
10 upon the first work and the mapping data, that the first work is to be
11 performed on a second node from the plurality of nodes; and
12 providing the first work request to a second process on the second node, wherein
13 the first work request specifies that the first process is to receive results of
14 the first work directly from the second process.

1 21. The computer-readable medium as recited in Claim 20, further including the steps
2 of
3 in response to receiving a second request to perform second work from the first
4 process, determining based upon the second work and the mapping data,
5 that the second work is to be performed on a third node from the plurality
6 of nodes, and
7 providing the second request to a third process on the third node, wherein the
8 second request specifies that the first process is to receive results of the
9 second work directly from the third process.

al 22. The computer-readable medium as recited in Claim 20, further including the steps
of
in response to receiving a second request to perform second work from a third
process on a third node from the plurality of nodes, determining based
upon the second work and the mapping data, that the second work is to be
performed on the second node, and
providing the second request to the second process, wherein the second request
specifies that the third process is to receive results of the second work
directly from the second process.

23. The computer-readable medium as recited in Claim 20, further including the steps
of
in response to receiving a second request to perform second work from a third
process on a third node from the plurality of nodes, determining based
upon the second work and the mapping data, a fourth node from the
plurality of nodes on which the second work is to be performed, and
providing the second request to a fourth process on the fourth node, wherein the
second request specifies that the third process is to receive results of the
second work directly from the fourth process.

24. The computer-readable medium as recited in Claim 20, further including the steps
of
determining based upon the first work and the mapping data, that the first work is
also to be performed on a third node from the plurality of nodes, and
providing a second request to a third process on the third node, wherein the
second request specifies that results of the first work performed on the
third node are to be provided from the third node directly to the first
process.

25. The computer-readable medium as recited in Claim 20, wherein the step of determining that the first work is to be performed on a second node includes the step of determining one or more resources required to perform the first work, and determining which of the plurality of nodes is allowed to perform the first work on the one or more resources.

26. The computer-readable medium as recited in Claim 20, wherein: the step of determining that the first work is to be performed on a second node from the plurality of nodes includes the step of a director determining that the first work is to be performed on a second node from the plurality of nodes, and the step of providing the first work request to a second process on the second node includes the step of the director providing the first work request to a second process on the second node.

27. The computer-readable medium as recited in Claim 20, further comprising the step of upon completion of the first work, the second process providing the results of the first work directly to the first process.

28. The computer-readable medium as recited in Claim 20, wherein the first work request is a remote procedure call.

29. The computer-readable medium as recited in Claim 20, further including the step of generating an updated first work request that specifies that the first process is to receive the first results of performing the first work and wherein the step of providing the first work request to a second process includes the step of providing the updated first work request to the second process.